ROYAL ASTRONOMICAL SOCIETY.

VOL. XVIII. *July* 9, 1858. No. 9.

Admiral R. H. MANNERS in the Chair.

Edwin Clark, Esq., Forest Hill; and
Thomas Noble, Esq., York,

were balloted for and duly elected Fellows of the Society.

New Edition of Kepler's Works.

Mr. Hind has forwarded to the Editor a letter which he has recently received from Professor Frisch of Stuttgart, relative to the new edition of Kepler's works which that gentleman is at present engaged in preparing for the press. It appears from the letter of Professor Frisch that the republication in a complete form of the works of his illustrious countryman is an object to which his efforts throughout life have been constantly directed. He states that he is now in possession of most of the manuscripts of Kepler, embracing his correspondence as well as his astronomical works. These manuscripts have either been discovered by himself at different libraries, or have been communicated to him by the Messrs. Struve of the Imperial Observatory, Pulkowa, to whom he expresses his obligation for intrusting him with that precious part of their library. The first volume was published about the end of last year. It contains a large number of letters, published for the first time, besides various other matters of interest. The second volume, which is now in the press, will comprise the optics and dioptrics, the essays on the satellites of *Jupiter* and the new star in the foot of *Serpentarius*, as well as several treatises which have not hitherto been published. Presuming that the amount derivable from the subscribers in Germany would not suffice to defray the expense of printing, Professor Frisch, with the view of obtaining foreign support, has written the various preliminary notices in Latin. The Governments of Würtemberg and Bavaria, the Academies of Berlin, Vienna, and St. Petersburg, and most of

the German libraries, have liberally subscribed to the undertaking. But in England, France, Italy, and America, only a few copies have been sold; and, although Professor Frisch does not ask any personal remuneration for his labour and the great pecuniary sacrifices which he has made, yet the publisher declares that his own expenses are not covered, and he doubts whether he will be able to continue the publication of the work.

Under these circumstances Professor Frisch appeals for support to the scientific public of England. It is to be hoped that a gentleman who has exhibited such a noble instance of abnegation on his own part, will receive a cordial response from the numerous individuals in this country who are capable of appreciating the discoveries of Kepler in astronomy and physics. In thus contributing towards the decoration of the monument which the great astronomer has erected from the resources of his own genius, they will assuredly offer a more appropriate homage to his memory than in attempting to perpetuate it by brass or marble.

New Planet.

A new planet was discovered at Paris on the 10th of September by M. Goldschmidt. The following position of it was obtained at the Imperial Observatory:—

	R.A. h m s	Decl. ° ′ ″
1858, Sept. 10	21 37 27·13	− 6 3 28·0

Daily Motion in R.A. = − 39ˢ

,, ,, in Decl. = + 1′

The planet has received the name of *Alexandra*. It forms the fifty-fourth of the minor-planet group.

New Planet.

(*Extract of a Letter from Dr. Gould to the Astronomer Royal, dated Albany, Sept.* 13, 1858, *on the Discovery of a New Planet.*)

"I write a hasty line to inform you of the discovery of a new asteroid by Mr. George Searle, assistant at this Observatory.

"It was first seen, and observed roughly, on the night of the 10th; its planetary character confirmed on the 11th, which was Saturday. To-day I have announced it.

"None of our instruments being available excepting the comet-seeker, no accurate observations have been possible. But I have telegraphed to other observatories, so that positions will doubtless

be obtained to-night with accuracy. The accompanying places have been roughly measured with a small ring-micrometer (except the first), and, though not entitled to much confidence, will, I think, suffice to insure its detection and recognition in Europe.

	Albany M.T. h m s	R.A. h m s	Decl. ° ′ ″
Sept. 10	10 30 0	0 49 2·0	+ 3 22 0
11	11 53 10	0 48 33·7	3 22 0
12	11 13 0	0 47 53·4	3 20 2
13	10 3 26	0 47 10·6	+ 3 18 3

Discovery of a New Comet. By Mr. H. Tuttle.

(*Letter from W. C. Bond, Esq. to the Astronomer Royal.*)

"We have obtained the following positions for a comet discovered at this observatory, by Mr. Horace Tuttle, on the evening of the 5th instant:—

1858. Cambridge M.S.T. d h m s	Apparent R.A. h m s	Apparent Decl. ° ′ ″
Sept. 5 16 5 24·7	4 41 0·24	+ 44 46 57·4
7 13 31 18·5	4 34 20·41	45 18 45·7
9 14 50 55·7	4 25 46·02	+ 45 54 52·6

"From these places Mr. Charles Tuttle has derived the following elements:—

T = 1858, Oct. 17·038128 G.M.T.
ϖ = 1° 30′ 23″
Ω = 158 58 0 } Mean Eq. 1858·0
i = 21 5 47
Log q 0·15267

Motion retrograde.

"Mr. Hall has also computed an orbit from the same data, which agrees essentially with that obtained by Mr. Tuttle.

"*Harvard College Observatory, Cambridge, U.S.*
1858, *Sept.* 14."

A Method of "Clearing the Lunar Distance." By Lieut. Raper, R.N.

The following method of clearing the lunar distance from the effects of parallax and refraction differs from those in general use in two important points. In the first place, instead of taking the

conditions from a figure or diagram, and applying the formulæ of Spherical Trigonometry, the problem is treated by the method of co-ordinates; and, in the second place, the refraction and parallax are considered separately and independently. The apparent distance being corrected, as the first step, for the effect of refraction alone.

As the refraction in altitude is a very small quantity, amounting only, in eligible cases of this observation, to a very few minutes, its higher powers, and the products of the refraction of both bodies, are insensible in practice; the correction is therefore easily made by an approximate process. We here consider the effect of refraction separately, and have, accordingly, nothing to do with the products of refraction and parallax, which enter only when we are finding the difference between the apparent and central distance. The rest of the process is of the kind called "rigorous."

Having found the distance due to the effects of the parallaxes alone (which we shall call the *parallactic distance*), the computation of the natural cosine of the true or central distance becomes a matter of singular brevity; and as no "preparation" of arcs, that is, no combinations of the sums and differences of the given arcs, framed to adapt the computation to logarithms, are required, the operation, especially in the case of a star lunar, has considerable advantage in respect of the amount of labour involved, over the more elaborate methods in general use.

Let $a\ b\ c$ be the co-ordinates of the sun, planet, or star, $x\ y\ z$ those of the moon, the plane of $a\ b$ or $x\ y$ being that of the rational horizon. We suppose, on the present occasion, the earth to be a sphere, and therefore the observer's normal to pass through the centre, which is the origin of co-ordinates. Let $s\ m$ be the distances of the sun and moon from the centre of the earth, and $s_{,}\ m_{,}$ those from the place of the observer; then

$$s = \sqrt{a^2 + b^2 + c^2}, \qquad m = \sqrt{x^2 + y^2 + z^2},$$
$$s_{,} = \sqrt{a^2 + b^2 + (c - r)^2}, \quad m_{,} = \sqrt{x^2 + y^2 + (z - r)^2},$$

r being the observer's radius, whence

$$s_{,} = \sqrt{s^2 - 2\,r\,c + r^2}, \quad m_{,} = \sqrt{m^2 - 2\,r\,z + r^2}.$$

If, therefore, δ be the true or central angular distance of the bodies, we have

$$\cos\delta = \frac{a}{s}\frac{x}{m} + \frac{b}{s}\frac{y}{m} + \frac{c}{s}\frac{z}{m}$$

Whence $s\ m \cos\delta = a\ x + b\ y + c\ z$.

In like manner if $\delta_{,}$ denote the parallactic distance at the spectator (or, as affected by *parallax alone*),

$$\cos\delta_{,} = \frac{a}{s_{,}}\frac{x}{m_{,}} + \frac{b}{s_{,}}\frac{y}{m_{,}} + \frac{c - r}{s_{,}}\frac{z - r}{m_{,}}$$

Whence $s_{,} m_{,} \cos \delta_{,} = m\, s \cos \delta - z\, r - c\, r + r^2$, and $s\, m \cos \delta = s_{,} m_{,} \cos \delta_{,} + c\, r + z\, r - r^2$; and, therefore, since $c = s \sin \alpha$, $z = m \sin \beta$; in which α and β denote the true or central alts. of the star and moon,

$$\cos \delta = \frac{s_{,} m_{,}}{s\, m} \cos \delta_{,} + \frac{r}{s} \sin \beta + \frac{r}{m} \sin \alpha - \frac{r^2}{s\, m} \quad . \ . \ . \quad (1).$$

Now $\frac{r}{s}$ is the sine of the sun's or star's parallax, and $\frac{r}{m}$ that of the moon, according to the radius of the ellipse in the observer's latitude, put for these $\sin \varpi'$, $\sin \varpi$, respectively, then the quotient $\frac{s_{,}}{s}$ becomes $\sqrt{1 - 2 \sin \varpi \sin \alpha + \sin^2 \varpi}$, which put $= \Pi'$.

Also $\frac{m_{,}}{m}$ becomes $\sqrt{1 - 2 \sin \varpi \sin \beta + \sin^2 \varpi}$, which put $= \Pi$. These quantities, Π, Π', which may be termed *parallactic ratios*, are easily tabulated under the arguments hor. par. and alt. The equation (1) becomes, omitting $\sin \varpi \sin \varpi'$, as insensible in all practical cases,

$$\cos \delta = \Pi\, \Pi' \cos \delta_{,} + \sin \varpi \sin \alpha + \sin \varpi' \sin \beta \quad . \ . \ . \quad (2),$$

which exhibits the cosine of the true distance, as represented by three terms, the computation of which is of the simplest kind; also, the last two being small, are sufficiently expressed by a reduced number of places in the logarithms.

In the case of a star $\frac{r}{s} = 0$, $\Pi' = 1$, and

$$\cos \delta = \Pi \cos \delta_{,} + \sin \varpi \sin \alpha \quad . \ . \ . \ . \quad (3)$$

The effect of the moon's refraction on the distance in her refraction in altitude multiplied by cos Z′ M′ S′, Z being the zenith, and M′, S′ the apparent places of the moon and star. That of the star is, in like manner, refraction $\times$ cos Z S′ M′.

The angles M′, S′ are very easily computed, as they are not required nearer than half a degree.

As for example,

$$\cos \mathrm{M} = \left(\frac{\sin \alpha'}{\cos \beta'} - \tan \alpha' \cos \delta' \right) \frac{1}{\sin \delta'}$$

where $\alpha' =$ App. alt. star; $\beta' =$ do. of moon; $\delta' =$ the apparent distance. These terms may easily be tabulated.

Example, Francœur's Astr. p. 251.

A. alt. $\odot = 30^\circ\ 33'$; true do. $30^\circ\ 31'\ 36'' = \alpha$
$\varrho' = 1'\ 21''$; A. alt. $\mathrm{D} = 53^\circ\ 14'\ 26''$; true do. $= \beta$
$= 53^\circ\ 46'\ 10''$; $\varpi = 54'\ 7''$; $\varrho = 39''$; A. dist. $= 61^\circ\ 58'\ 53''$.

Correction of dist. for moon's refr. or $\varrho \cos \mathrm{M} = 10''$; do. for sun's $1'\ 0''$, parallactic dist. or $\delta_{,} = 62^\circ\ 0'\ 3''$.

$\log \Pi = 9{\cdot}994469$, $\log \Pi' = 9{\cdot}999990$

$\cos \delta = \Pi\,\Pi' \cos \delta, + \sin \varpi \sin \alpha + \sin \varpi' \sin \beta$

$= {\cdot}463507 + {\cdot}007996 + {\cdot}000035$

$= {\cdot}471538$, cos of 61° 51′ 27″.

The deficiency of 6″ from Francœur's result (of 7 places) is probably owing to small inaccuracies.

Example 2. Francœur, p. 252. A. alt. *Regulus.*

70° 34′ 9″; refr. 20″; True alt. ✳ 70° 33′ 49″;
A. alt. ☽ 48° 0′ 49″; hor. par. 60′ 50″; refr. 53″
True alt. ☽ 48° 40′ 38″. App. dist. 58° 25′ 36″.

Here $< M' = 13° 39'$, corr. 51″; $< S' = 28° 18'$, corr. 17″. Parallactic dist. 58° 26′ 44″.

$\cos \delta = {\cdot}516390 + {\cdot}016686 = 0{\cdot}533076$,
cos 57° 47′ 11″, true dist.

Observations of η Argus. By the Rev. A. Stock.

(*Note from Mr. Stock, Sen. to Mr. Glaisher.*)

"My son, the Rev. A. Stock, of Wellington, wishes me to inform you of the following observations made by him at that port in New Zealand.

"'June 1, *η Argus* is now less bright than *γ Crucis*. The light has diminished very suddenly. I cannot say when, for it has stayed so long at one point that I had neglected to watch it.

"'Three months ago it was less than *α Crucis*. Call *α Crucis* 1, *η Argus* was 1·3. A fortnight ago I found it diminished. I will carefully watch the increase of the light. This star is sometimes as bright as *Sirius*, now it is very dim.'

"His letter is dated June 4, 1858."

Rediscovery of Encke's Comet.

Translation of part of a Letter from Professor Encke to the Astronomer Royal, dated Berlin, August 8, 1858.

"I still continue in your debt for the acknowledgment of Mr. Maclear's excellent observations in the year 1855, of Pons's Comet.* I retrieve it the more gladly now as I am able to communicate to you the discovery and ephemeris of this comet at its appearance in the present year.

"In the earlier observations of this comet in the southern hemisphere, the observations are inferior to those made in Europe

* Usually called Encke's comet.—Ed.

in point of accuracy. The newer instruments were wanting. In the year 1855, on the contrary, thanks to the skill of Mr. Maclear, and the beautiful $8\frac{1}{2}$-foot equatoreal with wire micrometer, the observations are perfectly on a level with the European, which I take the opportunity of begging to make known to Mr. Maclear with my best thanks. It is a real pleasure now constantly to see that the comet is observed at every return with an accuracy which, in the year 1819, there was no possibility of expecting.

"The comet deviated in the year 1855 rather considerably from the ephemeris. But six equations of condition for the time of its visibility soon showed that the cause lay chiefly, one might say solely, in the time of its perihelion passage, which was assumed too late. If we add to the mean anomaly 163″·4, or fix the passage 0·15178 day earlier, we obtain a path which agrees so nearly with the observations, that the difference from the true path can be only very trifling. I have here drawn up for you the comparison of Maclear's observations with the path of the ephemeris (A), and at the same time the comparison with the second path (B), which differs only from the other on account of the earlier time of passage. The elements are therefore:

(A). 1855, July 1·25, Berlin. (1) L. = 157° 53′ 32″·35; (2) M. = 0° 0′ 20″·01; (3) ϖ = 157° 53′ 12″·34; (4) Ω = 334° 26′ 23″·5; (5) i = 13° 8′ 9″·2; (6) n = 1076″·57567; (7) log. a = 0·3453080.

(B). 1855, July 1·10, Berlin. (1) L = 157° 53′ 34″·30; (2) M = 0° 0′ 21″·96; all other elements remain unaltered.

Maclear's observations are arranged on each day according to the order of time. The right ascension and declinations were always separately determined.

1855.	A.		B.		1855.	A.		B.	
	Δ R.A.	Δ Decl.	Δ R.A.	Δ Decl.		Δ R.A.	Δ Decl.	Δ R.A.	Δ Decl.
	′ ″	′ ″	″	″		′ ″	′ ″	″	″
July 13	− 8 20·2		− 22·1		July 22	− 8 46·3		−17·5	
		+7 27·5		− 0·9			+8 30·9		−10·2
16		+7 59·0		+ 8·4	24		+8 54·3		− 2·2
	− 8 11·4		− 20·8			− 9 3·5		−10·7	
17		+8 1·0		+ 3·4	25		+8 56·5		− 6·6
	− 8 15·5		− 23·1			− 9 18·9		−13·2	
		+8 0·7		+ 2·2			+8 56·9		− 6·3
18		+8 8·8		+ 1·9	27		+9 11·2		− 3·5
	− 8 14·4		− 17·9			− 9 43·2		− 8·8	
19	− 8 21·1		− 18·7		28		+9 17·7		− 1·1
		+8 26·5		+11·1		− 9 54·3		− 5·2	
	− 8 20·5		− 18·0						

1855.	A.		B.		1855.	A.		B.	
	Δ R.A.	Δ Decl.	Δ R.A.	Δ Decl.		Δ R.A.	Δ Decl.	Δ R.A.	Δ Decl.
	′ ″	′ ″	″	″		′ ″	′ ″	″	″
July 30	−10 17·9		+ 0·2		Aug. 9		+7 58·5		−10·5
		+9 21·1		− 1·6		−11 56·9		+ 8·6	
	−10 18·5		− 0·2				+8 0·4		− 8·4
31						−12 0·8		+ 4·8	
		+9 20·8		− 2·2			+7 51·2		−17·1
	−10 41·1		− 8·9		10				
		+9 18·2		− 4·8			+7 39·3		−15·1
	−10 42·7		−10·2			−12 4·0		+ 6·4	
	−10 39·6	+9 18·6	− 6·8	− 4·5			+7 41·2		−12·9
Aug. 1	−11 2·6		−16·4			−12 5·2		+ 5·2	
		+9 17·9		− 2·8	11		+7 29·6		−10·8
	−11 0·1		−13·7			−12 4·2		+10·4	
		+9 17·7		− 2·9			+7 26·8		−12·9
	−10 57·3		−10·7			−12 4·8		+ 9·9	
6		+8 31·7		−16·3	12		+7 17·0		− 8·2
	−11 37·5		+ 8·8			−12 6·6		+11·8	
7		+8 23·2		−12·9			+7 13·3		−11·5
	−11 52·8		+ 1·2			−12 10·5		+ 7·9	
		+8 27·8		− 8·0	16		+6 2·0		−15·2
	−11 56·0		+ 2·0			−12 2·4		+29·5	
8		+8 11·6		−11·5			+6 0·3		−16·5
	−12 5·2		− 5·0			−12 10·9		+21·1	
		+8 5·7		−16·9			+5 54·6		−21·8
	−12 2·0		− 1·7						

[I assume that the errors in R.A. are expressed in minutes and seconds of arc, not of time. The German practice of using the same symbols for subdivisions of the hour and of the degree leaves room for doubt.—G.B.A.]

"The individual observations may, according to the more or less favourable circumstances, be somewhat more or less accurate. But not one of them is exceptionable.

"Upon these elements I have acted; Herr Powalky has by them calculated the perturbations of *Jupiter* from forty to fifty days, and thereby the following elements for 1858 are deduced:—

Mean Longitude	157° 59′ 18″·0
Ascending Node	334 28 34 ·0
Log. *a*	0·3459881
Mean Anomaly	0° 1′ 48″·0
Inclination	13° 4′ 15″·0
Longitude of Perihelion	157° 57′ 30″
Mean Daily Southern Motion	1074·05

Available for 1858, Oct. 18·5, Berlin mean time and mean equinox.

"With these elements the accompanying ephemeris has been calculated by Herr Powalky.

"The great difficulty with this comet is that it intersects the paths of the planets *Mercury*, *Venus*, the Earth, *Mars*, or properly that its perihelion falls within the orbit of *Mercury*. On that account the calculations for the accurate perturbations of all the planets are so tedious, that I have been obliged to content myself for the present with those of *Jupiter*. They are this time not very small, because the comet comes near to *Jupiter*. The distance reaches its minimum in June 1856, although not the smallest possible.

"Under these circumstances it was of the greatest value to me to ascertain by an observation whether the deviation of the calculated place from the true place was very great. On the first evening on which, through the absence of moonlight, there was hope of finding the comet, which was on the 7th of August, it was sought for. And Dr. Förster actually found, in the first half-hour of the search, after his eye had accustomed itself to faint objects, in the place where the comet ought to be, a faint diffused nebulous mass, of about one minute in diameter, which he and Dr. Bruhns observed during about an hour, and in that time found that it had moved just as the ephemeris had predicted, so that there is no doubt that it is the comet. The reduction could be made by a star in Bessel, and gave the apparent place:

1858, Aug. 7, 13^h, 26′ 39″·4, M. Berl. T.
R.A. 63° 10′ 24″·2, Decl. + 31° 24′ 45″·26.

"The ephemeris gives, instead of this, if we take everything into the account,—

R.A. = 63° 9′ 51″·6, Decl. + 31° 25′ 4″·7,

so that the difference between calculation and observation is,—

R.A. = − 32″·6 in Arc, Decl. = + 19″·1,

and the place is as nearly correct as was the case at any single earlier appearance. It is indubitable that the error will be greatly increased with the approach of the time of passage through the perihelion. Nevertheless, it will only amount to some minutes in arc, so that the ephemeris will be perfectly available for finding the comet without difficulty, if it become brighter. It is now still very faint, so that I have, indeed, set and found it after Dr. Förster had directed my attention to it; but I could not observe it, as

it bore no illumination with me. The comparatively very good and accurate observations of my two assistants show, by their agreement, that the place will not differ by any appreciable time from the truth in R.A., and is still more certain in Decl.

"I would now request you kindly to make this ephemeris known in England,* especially to communicate it to Prof. Challis. I hope we shall obtain in September a numerous series of good observations, which would be so much the more acceptable as we now receive from the Cape of Good Hope as accurate observations for the time after the perihelion as in Europe before it. At this appearance it will, however, not be visible after the perihelion."

Translation of a Letter from Professor Encke, dated Berlin, August 13.

"I have reason to fear that in the copy of the elements the excentricity is forgotten. The complete system is,—

1858, Oct. 18·5, Berlin M.T.

	° ′ ″	
L =	157 59 18·0	
M	0 1 48·0	
π	157 57 30·0	
Ω	334 28 34·0	
i	13 4 15·0	
φ	57 49 16·8	e = 0·8463915
n	1074·05	
log a	0·3459881	

"Dr. Förster brings me again the following observations:—

	h m s	R.A. h m s	Decl. ° ′ ″
Aug. 9	14 12 7	4 20 53·21	+31 55 18·4
10	13 28 8	24 56·96	32 9 52·3
11	14 19 59	29 24·62	32 24 49·5

"The differences from the ephemeris are,—

	Calculation — Observation. s	″
Aug. 9	−1·48	+11·9
10	−1·40	− 2·8
11	−1·67	+ 7·9

"Formerly the principal error proceeded always from the time of the perihelion. I find for this appearance for an increase of the mean anomaly of 60″ that the changes of right ascension and declination stand thus:—

	R.A. s	Decl. ′ ″
Aug. 8	+10·1 in Time.	+0 20·0
12	11·2	+0 16·0
Oct. 3	13·9	−3 8·8
7	+13·6	−3 11·6

* This ephemeris, extending from August 7 to October 11, was duly printed and copies of it were forwarded to the various observatories throughout the country.— EDITOR.

"According to this we may expect that on the present occasion the ephemeris will continue uncommonly near the place during the whole appearance."*

Mr. Hind has printed and circulated an ephemeris of Encke's comet, extending from Aug. 7 to Oct. 11, 1858, reduced to the meridian of Greenwich, from M. Le Verrier's circular of Aug. 13, 1858. In a note to the Editor, dated Aug. 22, Mr. Hodgson states he perceived the comet at two o'clock on the morning of the 14th of that month, in the place indicated in the ephemeris. It had a filmy aspect, and appeared larger, perhaps, than *Jupiter*, but not 8′ or 10′, as it is said to be. It was, however, too low to see it fairly. Mr. Hodgson adds that whoever wants to see it must rise early and search with nothing less than a 4-inch refractor.

New Variable Star (U *Capricorni*). By Norman Pogson, Esq.

(*Communicated by M. J. Johnson, Esq.*)

A small star of the 10·5 magnitude has disappeared from its place in the heavens, and must therefore be considered as variable. Its position for 1860 was, R.A. $20^h\ 40^m\ 22^s$; N.P.D. 105° 18′. It was first seen and entered as a probable new planet, with the Radcliffe Equatoreal, on 1857, August 26th; and was then a quarter of a magnitude brighter than a star 2′ *s. f.* 34^s, or about 10·3 magnitude. As it remained unchanged in position and brightness on August 29th, the supposition of its planetary nature was no longer tenable. Other matters prevented me from obtaining further comparisons of its brightness relatively with neighbouring stars, until it had become lost in the evening twilight; and on again searching for it in June of the present year, on the 6th, 12th, and 18th inst., it was invisible, and certainly less than the 13th magnitude.

No such star was visible at the time of constructing this portion of my chart, viz. August 1855; nor yet on 1857, April 20th, when I swept over it most carefully with Dr. Lee's equatoreal while on a visit at Hartwell House. Agreeably to Prof. Argelander's notation, the name of this variable will be U *Capricorni*.

I may here take occasion to mention that Mr. Hind's very remarkable variable U *Geminorum* failed to reappear at the computed times of the last two maxima. I have looked for it continuously since its last actual maximum in November 1857, up to May 19th of the current year, but always in vain; though, agreeably to the ephemeris, it should have reappeared about Jan. 26th and May 2d. Possibly the few brief maxima observed

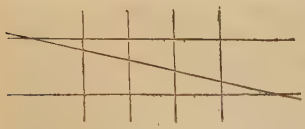
* [I suppose all these errors of R.A. to be expressed in time, and have so marked them.—G. B. A.]

were the last flickerings of an expiring star. If otherwise, the period will be one involving perturbations of a nature quite different to those which affect the elements of any known variable.

Additional Note on the Observation of a Solar Eclipse.
By R. C. Carrington, Esq.

"I should not trouble the Society with any further remarks on this subject, had I not been requested by one correspondent, well known to us by his friendly communications, to correct an omission which might otherwise be thought to be intentional, and by another to call the attention of English observers to a simple apparatus devised by Bessel and modified by himself, which it will certainly be desirable to bear in mind in 1860, though I did not recommend its use on the occasion of this autumn, on account of its requiring something like manipulation and the number of seconds available being so few.

"It has been pointed out to me that I have overlooked the observations and methods made use of by M. D'Abbadie in 1851, an accident which arose from my not continuing my search for records in the *Comptes Rendus* so far as the year 1854, in which an extract is given from M. D'Abbadie's memoir. In reference to the Report for Feb. 13 of that year, it will be seen that M. D'Abbadie already, in 1851, made the laudable attempt to measure by artificially assisted estimation the *rate* of uncovering of the principal red protuberance, and that his polariscopic means were superior to those of most other observers. Although the estimations of M. D'Abbadie seem to have been impaired in accuracy and consistency by the action of a violent wind which interfered with the movement of his telescope, the means which he had prepared for the purpose of estimation of angles of position and small angles of length deserve to be transferred to these pages. He proposed to employ a web of wires of the pattern represented in the figure, the use of which will be apparent on mere inspection; but on the disappearance of the sun, he found to his regret that the spider lines were too fine and disappeared, a fault which might easily be avoided on other occasions; and he had recourse to comparison with the depth of a notch in an interior position-circle nearly identical in design with that which I have recently recommended, and which for its more immediate purpose he found to answer very well.



"The apparatus of Bessel, which I have alluded to above, in the second place, is described in the *Astron. Nach.* No. 371, where it was originally proposed as an addition to a telescope in directing the eye to the point of the moon's limb at which the emersion of

an occulted star was to be looked for. Bessel recommended that the eyepiece, furnished with at least one wire, should be fitted so as to be turned readily in position-angle without disturbing the focal adjustment; and that, by an exterior divided circle, differences of position-angle might be read off with tolerable accuracy. If the wire be turned into the direction of diurnal movement of a star near to the moon, the division of the position-circle read, the computed position-angle of emersion then added, and the wire reset, he points out that on bringing the receding limb of the moon to the wire as a tangent, the point of contact will be the part of the limb at which the emersion is to be expected; and that this method of determining the point required involves no centering of the moon,—an idea which will perhaps be better understood by comparison with the means used by Mr. Swan for the eclipse of 1851. Dr. Littrow has proposed in the *Astron. Nach.*, Nos. 776 and 998, that this method of getting the position-angles of protuberances to the sun's limb in eclipses, should be used with the addition of a second position-circle in the interior of the telescope, inasmuch as the use of an exterior one during totality would cause loss of time, by the necessity of holding up a lamp to read its indications. He gives reasons at the same time for retaining both position-circles. Instead of a single wire, Dr. Littrow provided himself with a divided glass plate in his focus, having numerous fine equidistant parallel lines crossed at right angles by a second similar system. His preference to divisions on glass to spider wires arises from the practicability on glass of dividing with extreme accuracy, and with as small intervals as may be desired. He made use of such a divided plate in 1851, brings no complaint against it, and recommends it to the attention of future observers. Any line on the plate can be made tangent to the sun, if care be taken in not mistaking the quadrant recorded, and the apparatus may be used, though not so conveniently, on a telescope not parallactically mounted."

Account of the Results of the Trigonometrical Survey in the Cape Colony. By Thomas Maclear, Esq.

(*Letter to the Astronomer Royal.*)

"I send you the following results of the Trigonometrical Survey in the Cape Colony:

	Amplitudes derived from Astr. Observations.		No. of Stars.
	° ′ ″		
Royal Observatory to north end of arc ..	4 11 45·538	North	57
,, ,, to Kamies Sector Berg ..	3 34 34·096	North	63
,, ,, to Heerenlogements Berg	1 57 54·090	North	45
,, ,, to Zwart Kop	0 17 28·932	South	68
,, ,, to Cape Point	0 25 3·064	South	39

Assuming the latitude of the Observatory Station to be 33° 56′ 3″·20
,, the Major Axis of the earth = 41847426 feet } Airy's
,, the Minor Axis .. .. = 41707620 ,, } Elements.

"The following comparison exhibits the relation between the observed latitudes, calculated latitudes, and meridional distances, derived from the operation:—

Stations.	Lats. derived from Astr. Obs.	Lats. derived by Calc. from the Triangs. with above Elements.	Differences.	Meridional intervals from the triangn.	Approx. heights above sea of statns.
	° ′ ″	° ′ ″			Feet.
North end of arc	29 44 17·66	29 44 17·35	+ 0·31		3300
Kamies' Sector Berg	30 21 29·10	30 21 20·73	+ 8·37	224600·54	5000
Heerenlogements Berg	31 58 9·11	31 58 9·64	— 0·53	811506·83	2381
Royal Observatory	33 56 3·20	33 56 3·20		1526385·14	35
Zwart Kop	34 13 32·13	34 13 33·80	— 1·67	1632581·40	1939
Cape Point	34 21 6·26	34 21 6·80	— 0·54	1678373·85	688

"I have now some consolation for the suffering I endured in carrying the work into the Bushman flat; if the arc had terminated at the Kamies Berg the operation would have been of little value in the investigation of the dimensions and figure of the earth. The extended, rather the immense extent of the Bushman flat table land, the mean height of which above the sea-level exceeds 3000 feet, compared with the sweep southward, the elevation of which may be conjectured, by the crest or top of Heerenlogements Berg being only 1939 feet, is sufficient to account for deflection of the plumb-line.

"Towards the southern end we have 'Signal Hill,' immediately contiguous to, and north of, Zwart Kop, inferior as an equivalent for compensating the absence of matter over Simon's Bay.

"The Cape Point station curves eastward into the south end of False Bay, and is comparatively but little elevated above the sea. Open water to its north; the ridge, of which Zwart Kop is one of the crests, a few degrees to the N.W.; the small rise on which Owen's pile stands, to the S.E.

"Here the deflection (of small amount) might be expected towards the north, and perhaps is so, for the numbers representing the latitudes depend upon the latitude of the Observatory, and the latter is affected by the mass of Table Mountain to the south-west.

"We shall know more on this subject presently by the comparison of the Rogge Bay Guard-House sector-station, with the Observatory.

"La Caille's Klip Fontein station is not included in the present amplitudes.

	Feet.
For distance between Bradley's Sector-station at Klip Fontein and the Rogge Berg Sector-station is by the modern triangulation	445018·14
By the triangulation (Part I.) for connecting La Caille's with the Royal Observatory, the parallel of Mrs. De Witt's chimney is north of the parallel of the Royal Observatory	4583·81
	449601·95
By the modern triangulation, the distance between the parallels of Bradley's Sector-station at Klip Fontein and the Royal Observatory is	449767·23
Hence the distance between Mrs. De Witt's chimney and the Guard-house appears to be	165·28

"By the plan of Mrs. De Witt's buildings, plate 1, part I., the meridional distance seems to be about 166 feet, but I purpose verifying this next week, by direct measurement over the roofs of the houses, and an observation for azimuth. The chimney position is close to the parapet next Strand Street, and to the line that marks the division between Mrs. De Witt's house, and the adjoining house, No. 1 (the corner house).

"I examined the chimney last week—the nail remains that fixed the disc's centre to the chimney brick-work, also the black pointed circle that surrounded it is visible through the whitewash.

"In the discussion of the zenith distances, no correction has been applied for division-errors of sector, as they appear to be of questionable amount. (Simultaneous observations for this element were made with the mural circle.) This and the method of weighting the zenith distances will be discussed hereafter. In the meantime I am pretty certain that the amplitudes as now given will not be sensibly altered by any legitimate calculation, other than has been adopted. From this remark must be excepted, taking the mean of the stars north of the zenith, and comparing it with the mean of the stars south of the zenith at any station; the number of stars on each side cannot be selected to fulfil this condition throughout the extent of the arc, where the available range of the sector-arch barely reached $5\frac{1}{2}$ degrees on each side of zero. A few stars may be selected at each station to try the question. The observations of *Fomalhaut* and *α Columbæ* are not so accordant as the others, for which a plausible reason can be adduced.

"In all cases the sector stations are reduced to the adjacent theodolite stations where necessary. At Cape Point the sector and theodolite were on the same parallel and near each other.

"At Zwart Kop the sector was south of the theodolite station, reduction 169·85 = 1″·680.

"At the observatory they were on the parallel, distant 24 feet.

"At Heerenlogements Berg, the sector was 377·62 feet north of the theodolite, or 3″·737.

"At the Kamies Berg the sector was 92·667 feet north of the theodolite or 'West rock' station = 0″·917.

"At the Bushman flat or north end of the Arc station, they were parallel and near to each other.

"It may be proper to mention, that an error was committed in taking out a logarithm, when preparing the paper sent to you some years ago. I cannot refer to the particulars conveniently at this moment, but I think it was in the triangle connecting Elands Berg with Heerenlogements Berg, and that the effect was about 30 feet. The equations of condition rake up everything, with unflinching severity.

"I am much obliged for the copy of Vlacq's logarithms. The setting numbers of the equations were calculated with 7-place logs., (several months before the arrival of Vlacq); no advantage would be gathered by spending another six months on that department of the reductions with Vlacq; the angular measures are not sufficiently accurate to justify the labour, nor indeed the angular measures of any geodetic operation yet performed.

"*Royal Observatory, Cape of Good Hope, June* 19, 1858."

γ Virginis:—Results of the Measures of this Binary Object for the Epoch 1858, *as determined by Vice-Admiral Smyth, at the Hartwell Observatory, with a double-wire Micrometer, under a power of* 340.

Date (t)	Position $\angle$	Weight. w	$w.$ $(\angle - 170°)$	$w.$ $(t.-1858)$	Observations.	Distance. Δ	Weight. w	$w.$ $(-.\Delta 4'')$	Observations.
1858.	° ′		′			″			
Feb. 4·10	169 43	40	− 680	+ 400	8	3·44	24	−1344	6
8·11	169 36	36	− 864	396	7	4·01	16	+ 16	4
18·14	170 31	46	+1426	644	9	4·01	26	+ 26	6
May 6·35	170 53	40	+2120	1400	8	3·55	19	− 855	6
7·35	169 56	44	− 176	1540	7	3·90	30	− 300	6
8·36	170 37	41	+1517	1476	7	3·56	24	−1056	6
10·36	170 23	42	+ 966	1512	7	3·97	29	− 87	6
11·36	169 15	45	−2025	1620	7	3·97	24	− 72	6
June 13·40	169 30	20	− 600	920	6	3·79	18	− 378	6
14·46	168 57	35	−2205	1610	7	4·11	24	+ 264	6
15·46	168 54	48	−3168	2208	8	4·15	31	+ 465	8
18·47	170 9	40	+ 360	1880	8	3·43	25	−1425	6
398		−268	−9718	+15006	89		−193	−5517	72
		+209	+6389				+ 97	+ 771	

Conclusion.

Sum of ($\angle$ *s. w.*), $\therefore$ mean of Position = 169°54′·31.
Sum of (Δ *w.*), $\therefore$ mean of Distance = 3″·7937.
Sum of (*w. t.*), $\therefore$ mean of Epoch = 1858·392.

Corresponding Angles and Distances forwarded expressly for comparison with the Hartwell Measures, from the following Observatories, namely :—

Observatory.	Position. ° ′	Distance. ″	Epoch.	Observer.
Greenwich	168 30	3·847	1858·48	R. Main.
Haddenham	168 47	3·682	1858·45	W. R. Dawes.
Tarn Bank	170 01	3·567	1858·387	I. Fletcher.
Wrottesley	170 42	3·401	1858·476	F. Morton.

Note from Capt. Jacob to the Editor, relative to the Ternary Star 51 Libræ.

"I beg to call the attention of astronomers, possessing powerful telescopes, to the present condition of the close pair of the ternary star 51 *Libræ*. The early measures of this pair were considered by Admiral Smyth (see *Cycle*, vol. ii. p. 352) to indicate a circular orbit; but the stars, which have latterly been gradually approaching, have within the last two years closed up so rapidly as to be in the early part of the current year quite beyond the power of my instrument, the distance being estimated as not exceeding 0″·4, while only a rough guess could be made at the angle under the most favourable circumstances, I have not yet computed an orbit, though the data are, I believe, sufficient for doing so approximately, the apparent orbit must be highly elongated, and the period somewhere about 52 years.

"In the meantime it is evidently important that the pair should be carefully watched for the next year or two with such instruments as are still capable of dividing it."

Positions of the Solar Maculæ and Faculæ on the day of the South American Eclipse. Observed at Redhill by R. C. Carrington, Esq.

In the pamphlet which I prepared for this occasion and circulated in the month of June, observers of the eclipse of Sept. 7 were requested to note the positions of spots near to the sun's limb, as well as the angles of position of any red protuberances seen during totality, partly for the sake of comparison, but principally that the positions of the protuberances, if affected by any general error, might be thereby subsequently corrected by the amount

required by their positions of the spots as exhibited by more accurate observations in Europe. As I was unable to take part personally in the eclipse expeditions, I made a particular point of attending to the maculæ and faculæ which appeared on the sun on the days preceding and following that of the eclipse; and though the degree of success which has attended the expeditions is not yet announced, I hasten to record those data which I felt myself as it were bound to supply.

The 7th of September was at Redhill most unfortunately cloudy and wet, and on the 6th and 9th other engagements, which did not admit of being deferred, called me from home; but on the 5th and the 8th I obtained observations which will suffice for the purpose, and which I have reduced to the instant of totality on the West Coast.

I give the conclusions very briefly till there may appear necessity for more detail.

1858, Sept. 7^d, $0^h\ 48^m$ G.M.T.

1. Facula on the following limb from 84° to 102° (from N. by E.).

2. A well-defined elliptical patch of facula at a distance of 0·03 × radius from limb, at 133°.

3. Facula on the preceding limb, from 265° to 279°.

4. An elongated spot at 149° 0′, very near the limb. Distance from centre 0·99.

5. At 255° 30′ and distance from centre 0·69, the principal nucleus of a large and increasing group.

6. At 273° 30′ and distance 0·89, the principal (but small) nucleus of a departing group.

7. At 304° 20′ and distance 0·96, the principal nucleus of another group on the wane.

8. At 330° 30′ and distance 0·20, a small nucleus with penumbra, nearly gone (if not quite) on the 8th.

9. Several detached dots too varying to be inferred from one day to another.

Spots 4, 6, and 7, are such as I advised observers to avail themselves of.

Results of the Observations of Small Planets, made at the Royal Observatory, Greenwich, in the month of June, 1858.

(*Communicated by the Astronomer Royal.*)

Hebe.

Mean Solar Time of Observation.	Apparent R.A.	Apparent N.P.D.
h m s	h m s	° ′ ″
1858, June 9 9 47 45·0	14 59 36·83	84 45 21·58
12 9 34 11·6	14 57 50·86	84 54 25·86

Parthenope.

Mean Solar Time of Observation.	Apparent R.A.	Apparent N.P.D.
h m s	h m s	° ′ ″
1858, June 12 13 25 42·3	18 49 59·61	108 37 5·92
18 12 57 13·4	18 45 5·31	108 51 33·07
22 12 37 53·7	18 41 28·75	109 2 29·64
28 12 8 36·0	18 35 45·52	109 20 17·33

Iris.

Mean Solar Time of Observation.	Apparent R.A.	Apparent N.P.D.
h m s	h m s	° ′ ″
1858, June 25 13 52 25·7	20 8 2·61	105 35 40·92
28 13 38 23·4	20 5 47·72	105 33 8·00

Note from Capt. Clarke, R.E., to the Editor.

"The correction to the latitude determined from a transit observed in the prime vertical, on account of azimuthal deviation, level, and collimation errors, has a singular resemblance to the correction to a transit in the meridian; the former may be put in the form

$$\frac{a \sin z + b \cos z + c}{\cos z}$$

and the latter is

$$\frac{a \sin z + b \cos z + c}{\cos \delta}$$

the quantities $a\ b\ c\ z$ representing the same things in each case.

"*Southampton, July* 12, 1858."

New Elements of Comet II., 1858, *being an Extract of a Letter from Dr. Winnecke to Mr. Carrington.*

(*Translation.*)

"The second comet of this year, which is additionally interesting on account of its identity with one of 1819, has been found at St. Jago by Dr. Moesta, after its perihelion passage, by means of my ephemeris, forwarded by Dr. Argelander. Since his observation of May 29, the only one which Moesta had provisionally reduced, differs from the position given by my last elements

by about a minute of time in R.A., I have been at the pains to deduce new elements from the observations, now extending over 82 days. They are as follows,—

Epoch May 30, Berlin Time.

M	=	359	59	12·75	
$\varpi - \Omega$	=	162	6	3·84	Mean Equinox 1858·0
Ω	=	113	32	48·50	
i	=	10	48	3·78	
φ	=	48	59	47·78	
μ	=			639″·4465	
Log a	=			0·4961350	

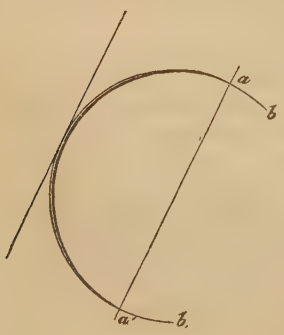
The period which hence results is 5·549 years, and that which is given by the supposition that the comet has performed seven revolutions since 1819 gives 5·541, so that this conclusion is no doubt correct. You will oblige me if you will have the goodness to communicate these elements to the Royal Astronomical Society when it may be convenient.

"*Pulkova, August* 20, 1858."

Additional Note relative to the Approaching Conjunction of Venus. By Professor Mädler.

In reference to the observations of *Venus* at the conjunction 1858, December 13, proposed by Professor Mädler (*Monthly Notice*, Vol. XVIII., No. 8, June 11, 1858) for the purpose of determining the horizontal refraction at the surface of *Venus*, Professor Mädler has favoured the Astronomer Royal with the following explanation:—

"I determined the extension of the visible circumference with the aid of a wire-micrometer. The horns of the planet were too faintly visible to bear the approximation of a wire, therefore I made the distance of the parallel wires equal to the apparent semi-diameter of *Venus*.



"The prolongations $a\,b$ and $a'\,b'$ are the effect of the apparent radius of the sun, as seen from *Venus*, combined with the horizontal refraction in the atmosphere of *Venus*. These prolongations are, however, mere estimations; for the single results you will find them in the *Astronomische Nachrichten*, Vol. XXIX., No. 679.

"If we put

p = circumference observed in degrees,

v = distance of the centres of *Venus* and the sun, also in degrees,

r = radius of the sun = 1

ϱ = radius vector of the planet,

then we have

$$\sin \psi = \sin v \sin \frac{p - 180^\circ}{2}$$

and the horizontal refraction on the surface of *Venus*,

$$= \frac{\psi - \frac{r}{\varrho}}{2}$$

"The refraction 43′·7 is the mean of seven determinations."

Occultation of α Scorpii, Observed at Williamstown, Victoria.
By Mr. Ellery.

April 30, and May 1. "Observed the immersion of *α Scorpii* —disappearance rather peculiar—the star appeared to skim along the moon's limb for a considerable time, with scarcely any perceptible diminution of light, at last disappeared by a *jerk* as it were, time of immersion obtained very accurately.

"Watched carefully three minutes before the calculated emersion from the moon's dark limb. A very small but peculiarly bright speck suddenly became visible, and but from the different colour should have thought it to be the apex of a mountain becoming illuminated (as the moon was near the full), but it was suddenly covered, as it were, by the blaze of light caused by the emersion of the star; the interval elapsed I estimated at 4ˢ·5, the light of the small speck or star was not so yellow as the illuminated spots on the moon's limb, but rather *bluer*.

	h	m	s
True sidereal time of immersion	2	21	56·13
Emersion	3	1	26·10

"The instrument used was the altazimuth, with a power of 95. The weather was very favourable and the atmosphere very steady, the moon's limb excessively clear and well defined. The time of emersion may be erroneous to the amount of four-tenths of a second, as the watching the small companion somewhat diverted the attention.

"On the same night observed the culmination of the moon and *α Scorpii*.

	h	m	s
R.A. *α Scorpii*	16	20	45·00
Moon's 2d L.	16	23	52·30

"*Astr. Observatory, Williamstown, Victoria.*"

Occultation of Regulus by the Moon, May 19, 1858. Observed by Captain Noble.

	h	m	s	
The star disappeared instantaneously at	13	6	7·3	Local Sid. Time.
And reappeared (also instantaneously) at	13	35	7·0	

"The telescope employed was my equatoreal of 4·2 inches aperture and 61 inches focal length, with a power of 74 adjusted on *Regulus*. The atmospheric tremor was very great, *Regulus* was noticeably brilliant on emersion.

"*Observatory, Forest Lodge, Maresfield.*"

Elements of Comet III. 1858. By Mr. A. Hall.*

T = 1858, May 1·8283 Washington M.T.

π =	195	42	54·2
Ω =	171	3	29·6
i =	23	11	5·0

$\log q$ = 0·082429

Motion direct.

These elements were computed from two Cambridge (U.S.) positions of May 4 and 12, and one obtained at Ann Arbor on the 9th of the same month.

Elements of Comet IV. 1858. By Dr. Bruhns.†

T = 1858, June 5·21536 Berlin M.T.

π =	226	6	46·6	App. Equinox, May 23
Ω =	324	21	55·6	
i =	80	28	48.1	

$\log q$ = 9·737356

Motion retrograde.

These elements were calculated from the observations of May 21, 23, and 26.

Observations, Elements, and Ephemeris of Comet V., 1858.‡ By Dr. Donati.

(*Communicated by Mr. Drach.*)

1858.	Florence M.T. h m s	App. R.A. h m s	App. Dec. ° ′ ″	Stars of Comp.	No. of Comp.
June 28	9 47 5	9 29 57·47	+26 26 9·5	(*e*)	2
July 14	9 26 44	9 38 58·16	+27 54 16·4	(*i*)	4

* *Ast. Nach.* 1149. † *Ast. Nach.* 1146.

‡ Further observations of this splendid comet, which was discovered by Dr. Donati on the 2d of June, and has been visible to the naked eye for the last month, will appear in the next number of the *Monthly Notices*.—Ed.

	Comet — Star. Δ R.A.	Δ Decl.
	m s	′ ″
With (*e*)	−3 31·50	−7 23·2
With (*i*)	+0 14·32	+5 30·9

"Mean places of the stars of comparison for 1858·0:—

	R.A. h m s	Decl. ° ′ ″	
(*e*)	9 23 27·80	+26 33 30·0	13 Leonis, B.A.C. 3309
(*i*)	9 38 42·54	+27 48 43·4	B. Z. 349

The star (*i*) is identical with Lalande's Catalogue, 19165, (English edition); but the right ascension registered in that catalogue is too great by 30ˢ.

"From the foregoing observations, and the observation of June 7, I have calculated the following parabolic elements:—

$$T = 1858, \text{ Sept. } 29{\cdot}20697 \text{ G.M.T.}$$
$$\log q = 9{\cdot}7603484$$
$$\left.\begin{aligned} \varpi &= 294\ 23\ 59{\cdot}6 \\ \Omega &= 165\ 24\ 21{\cdot}4 \end{aligned}\right\} \text{Mean Equinox of } 1858{\cdot}0$$
$$i = 116\ 56\ 11{\cdot}7$$

or, distinguishing the retrograde motion,

$$\varpi = 36\ 24\ 43{\cdot}2$$
$$i = 63\ 3\ 48{\cdot}3$$

"These elements satisfy the middle observation thus:—

	Obs. — Calc.
Long.	−0″·1
Lat.	+0″·3

"They have some resemblance to the elements of Comet I., 1827.

"*Florence, July* 20, 1858."

The ephemeris computed by Dr. Donati from the foregoing elements, extends from July 25 to October 13. The following are the places for October.

For Mean Noon Greenwich.

1858.	R.A. h m s	Decl. ° ′	Log. Δ	Brightness of the Comet, that of June 7 being unity.
Oct. 3	13 43 56	+23 55·3	9·7887	223·0
,, 8	14 46 3	+9 21·4	9·7319	264·5
,, 13	15 25 14	−8 16·3	9·7410	218·4

Rediscovery of Faye's Comet; Remarks on Encke's Comet.

(*Extracts from a Letter from Prof. Encke, to the Astronomer Royal, dated Berlin, 1858, Sept. 11.*)

"Herewith I have the honour of sending to you some very approximate places of Faye's Comet. My assistants, Drs. Bruhns and Förster, had on the 8th of Sept. divided into zones the region where Faye's comet ought to be, according to Mr. Hind's sweeping ephemeris, and observed them in turn. In one of the zones which Bruhns was observing, he remarked a very faint nebulous spot, which was proved on the 9th and 10th to be Faye's comet. From the two places thus obtained, Dr. Bruhns has calculated its future path.

"The observations of Pons's comet go on quietly; it is now so bright that it cannot escape notice even with inferior instruments. The last observations give the deviation from the ephemeris almost exactly equal to nothing. In all there are, besides yesterday's, eleven.

	R.A.	Decl.		R.A.	Decl.
	s	"		s	"
Aug. 7	− 2·17	+ 19·1	Aug. 18	− 1·32	+ 21·9
9	1·48	+ 11·9	19	− 0·53	+ 15·7
10	1·40	− 2·8	Sept. 2	− 0·18	+ 2·8
11	1·67	+ 7·9	8	+ 0·12	+ 4·8
13	2·41	+ 16·4	9	+ 0·29	− 0·1
17	0·86	+ 12·7			

"The form of the comet offers no determinate point of condensation. Bruhns himself and Förster take evidently a different point for the centre of condensation. The great comet will again give occasion to so-called physical observations.

"In the Paris Academy Pons's comet has been spoken of on the 16th of Aug. with relation to the hypothesis of a resisting medium. This has induced me, in a memoir, which will appear in a short time in the *Jahrbuch* for 1861, to put together the striking arguments in its favour. For 1829 I have assumed, agreeably to the deductions drawn from the years 1819–48, that the mean motion was

$$= 1069''{\cdot}85252 + 0''{\cdot}097774\, n,$$

and the periodic time

$$= 1211^{d}{\cdot}3818 - 0^{d}{\cdot}055392\ 2n$$
$$= 1211^{d}{\cdot}3818 - 0^{d}{\cdot}110784\ \ n,$$

where n is the number of periods of 1200 days, or nearly the number of revolutions which have elapsed since 1829. For 1858 where n was $= 9{\cdot}060$, the perihelion passage was thereby accelerated by full 4544 days. In the geocentric place, the neglect of the hypothesis would have produced an error of about 3° 20′, which was reduced to nothing by the adoption of the hypothesis. I will do myself the honour to send you some extra copies, as soon as the memoir is printed."

Besides the sweeping ephemeris above alluded to by Professor Encke, Mr. Hind subsequently circulated an ephemeris of Faye's Comet, from September 5 to October 31, 1858, reduced to the meridian of Greenwich from a manuscript ephemeris computed from the following elements, and obligingly supplied by Dr. Bruhns.

Perihelion Passage 1858, Sept. 12^{d}·64204 M.T. at Berlin.

π	49 49 4·6	Mean Equinox
ϑ	209 45 23·4	1858, Sept. 13^{d}·0.
i	11 21 36·7	
φ	33 42 43·4	
n	475″·1849.	

The following are the places of the ephemeris from October 8 to October 31 :—

Year, Month, and Day.	Right Ascension.		Declination.		Logarithm of Distance from			
					Earth.		Sun.	
1858.	h m s	Δ_1 m s	° ′	Δ_1 ′		Δ_1		Δ_1
8	6 37 2	+1 48	+14 41·4	−11·9	·1120	−22	·2351	+4
9	6 38 50	1 47	14 29·5	12·0	·1098	21	·2355	4
10	6 40 37	1 45	14 17·5	12·1	·1077	21	·2359	5
11	6 42 22	1 43	14 5·4	12·2	·1056	22	·2364	4
12	6 44 5	1 41	13 53·2	12·3	·1034	21	·2368	4
13	6 45 46	1 39	13 40·9	12·3	·1013	21	·2372	4
14	6 47 25	1 38	13 28·6	12·4	·0992	21	·2376	5
15	6 49 3	1 36	13 16·2	12·5	·0971	22	·2381	4
16	6 50 39	1 33	13 3·7	12.7	·0949	21	·2385	5
17	6 52 12	1 32	12 51·0	12·7	·0928	20	·2390	5
18	6 53 44	1 30	12 38·3	12·8	·0908	20	·2395	5
19	6 55 14	1 28	12 25·5	12·8	·0888	21	·2400	5
20	6 56 42	1 26	12 12·7	12·9	·0867	21	·2405	5
21	6 58 8	1 24	11 59·8	12·9	·0846	20	·2410	5
22	6 59 32	1 21	11 46·9	12·9	·0826	20	·2415	6
23	7 0 53	1 20	11 34·0	13·0	·0806	20	·2421	5
24	7 2 13	1 18	11 21·0	13·0	·0786	20	·2426	6
25	7 3 31	1 15	11 8·0	13·0	·0766	20	·2432	6
26	7 4 46	1 13	10 55·0	13·1	·0746	21	·2438	6
27	7 5 59	1 11	10 41·9	13·1	·0725	20	·2444	5
28	7 7 10	1 9	10 28·8	13·2	·0705	19	·2449	6
29	7 8 19	1 7	10 15·6	13·2	·0686	20	·2455	7
30	7 9 26	1 5	10 2·4	13·3	·0666	20	·2462	+7
31	7 10 31	+1 3	+ 9 49·1	−13·3	0·0646	−20	0·2469	

Translation of Part of a Letter from Prof. Encke to the Astronomer Royal, dated Berlin, 1858, Sept. 26.

"In a few days you will receive a work, which has just been published by Prof. Wolfers, namely, the continuation of the *Tabulæ Regiomontanæ*. I had already caused to be calculated, by Prof. Zech, a continuation from 1850 to 1860 for the computation of the *Jahrbuch*. It is annexed to Wolfers' book. I had repeatedly proposed to my fellow-labourers in this place a further continuation, but with new values for nutation and aberration, as also for new star-places. So much the more opportune for me was it that Wolfers resolved to apply himself to it. He has continued it to the year 1880.

"I believe that the book completely answers its purpose, and I can say this the more freely because I have not had the least participation in it. For the formation of the star-catalogue, I proposed to him to consult Prof. Argelander, whom I consider in these matters the greatest authority that we have amongst the German astronomers. Bessel's precession has been retained, and for aberration and nutation the numbers of Struve and Peters are taken. Everything else is entirely Wolfers' performance. It certainly would be desirable that these tables should be known in England also (the text is in Latin); I have with this view advised him to send copies to the Royal and Astronomical Societies, and would request you, if the Tables are brought forward, to speak in their behalf. Works of this nature deserve every possible encouragement. The comet observations proceed here regularly. That of Donati will yet give opportunities for many observations. It begins rather to remind one of Halley's comet. At least there is a trace of radiations in the head. When the moonlight no longer prevents it we shall be able to see it more distinctly.

"Pons's and Faye's comets show no great deviation from the ephemerides. The former is becoming very bright, the latter is still very faint."

Elements of Calypso. By M. Oeltzen.

Epoch 1858, April 27·514725, B.M.T.

M	=	75	20	50·8	
ϖ	=	94	38	36·2	Mean Equinox, 1858·0
Ω	=	143	30	11·7	
i	=	5	3	38·8	
φ	=	10	23	3·6	
μ	=	840″·086			
Log a	=	0·4171220			

These elements were computed from the Bilk observation of April 4, and two Berlin observations of May 20 and May 27.

Capt. Shea continues to observe the solar spots on every practicable occasion, and communicates the results to the Society. They consist as usual of a series of graphic representations of the positions of the spots on the solar disc for the various days to which the observations refer.

For sale, a Sisson Achromatic Equatoreal, by Troughton and Simms, London. Object-glass $5\frac{1}{4}$ inches clear aperture; 7 feet 8 inches focal length; polar axis, 11 feet 3 inches long, by 11 inches square; wheels, brass, 2 feet diameter. The telescope has a micrometer and a large battery of eye-pieces, and a great variety of diaphragms.

A very superior $8\frac{1}{2}$-feet Munich telescope, by Merz and Sons. tube mahogany; object-glass $6\frac{3}{8}$ inches clear aperture, with micrometer by Dollond, and a large battery of eye-pieces.

A heavy iron mortar Equatoreal, suitable for a tube from 10 to 15 feet, with declination and right-ascension circles. This style of equatorial is remarkable for its stability, and freedom from tremor.

A Varley stand, suitable for a telescope of from 4 to 8 feet.

For particulars apply to Mr. Hew Miller, Ochtertyre, Crieff, N.B.

Ochtertyre, 27th September, 1858.

Errata in Vol. XVIII. of the Monthly Notices.

Page 1, line 5 from bottom, *for* 0·28443, *read* 0·028443.

— 14, line 7 from bottom, *for* $-1^m\,21^s{\cdot}99$, *read* $-1^m\,21^s{\cdot}97$.

— 14, line 7 from bottom, *for* $-1^m\,18^s{\cdot}14$, *read* $-1^m\,8^s{\cdot}14$.

— 265, lines 9, 10 from bottom, *for* cos ϖ, *read* sin ϖ.

— 273, line 1 from top, *for* May 14–15, *read* March 14–15.

CONTENTS.

	Page
Fellows elected	301
Letter from Prof. Frisch of Stuttgart, respecting the new edition of Kepler's works	ib.
New Planet, discovered by Mr. Goldschmidt	302
Ditto, discovered by Mr. George Searle	ib.
New Comet, discovered by Mr. H. Tuttle	303
A Method of "Clearing the Lunar Distance," by Lieut. Raper, R.N. ...	ib.
Observations of *η Argus*, by the Rev. A. Stock	306
Rediscovery of Encke's Comet, Letters from Prof. Encke to the Astronomer Royal	ib.
New Variable Star (U *Capricorni*), by Mr. Pogson	311
Additional Note on the Observation of a Solar Eclipse, by Mr. Carrington	312
Account of the Results of the Trigonometrical Survey in the Cape Colony, by Mr. Maclear	313
Results of the Measures of *γ Virginis* for the Epoch 1858, determined by Vice-Admiral Smyth	316
Note by Capt. Jacob relative to the Ternary Star 51 *Libræ*	317
Positions of the Solar Maculæ and Faculæ on the Day of the South American Eclipse, by Mr. Carrington	ib.
Observations of Small Planets, made at the Royal Observatory	318
Note from Capt. Clarke to the Editor	319
New Elements of Comet II. 1858, by Dr. Winnecke	ib.
Additional Note relative to the Approaching Conjunction of *Venus*, by Prof. Mädler	320
Occultation of *α Scorpii*, observed at Williamstown, Victoria, by Mr. Ellery	321
Occultation of *Regulus* by the Moon, observed by Capt. Noble	322
Elements of Comet III. 1858, by Mr. Hall	ib.
Elements of Comet IV. 1858, by Dr. Bruhns	ib.
Observations, Elements, and Ephemeris of Comet V. 1858, by Dr. Donati	ib.
Rediscovery of Faye's Comet, and further remarks on Encke's Comet, Extract of a Letter from Prof. Encke to the Astronomer Royal	324
Ephemeris of Faye's Comet, by Dr. Bruhns	325
Continuation of the *Tabulæ Regiomontanæ*, by Prof. Wolfers	326
Elements of *Calypso*, by M. Oeltzen	ib.
Capt. Shea, on the Solar Spots	327
Miscellaneous	ib.

INDEX.

Page

Aglaia, observations of 32, 71
Airy, G. B., remarks on the application of photography to astronomy 16
———, notice of his paper on ancient eclipses 92
———, account of operations executed at the Royal Observatory during the past year 100
———, suggestions respecting the annular solar eclipse of March 14–15, 1858 129
———, note on Oltmann's calculation of the eclipse of Thales 143
———, on a method of very approximately representing the projection of a great circle on Mercator's chart 151
———, remarks on Col. James's geometrical projection of the sphere, and on the stereographic projection 178
———, on the determination of the longitude of the Observatory of Edinburgh by galvanic signals of star-transits 252
———, instructions and chart for observations of *Mars* in right ascension at the opposition of 1860, for obtaining the measure of the sun's distance 277
———, notice of his report to the Board of Visitors of the Royal Observatory for 1858 293
———, notice of volume of the Greenwich Astronomical and Meteorological Observations for 1856 299
Amphitrite, observations of 141, 168, 234
Annual report of the Council, Feb. 12, 1858 85
Associates, list of deceased during the past year 93
Astrea, observations of 4, 31

Barclay, J. G., annular solar eclipse of March 14–15, 1858, observed by .. 190
Bate, Capt., observation of the solar eclipse of Sept. 17–18, 1857, by 162
Baxendell, Joseph, results of measures of γ *Virginis* 11
———, ———, occultation of *Regulus* observed by 276
Beaufort, Sir F., biographical notice of 93
Bloxam, J. M'Kenzie, on the mathematical theory and practical defects of clock escapements 265
Biographical Notices :—
Professor Colla 93
Sir F. Beaufort ..... ib.
Dr. Drew 98
Dr. Dick ..... ib.
Dr. King ..... ib.
Rev. W. Maddy 99
Mr. Wild 100
Bond, W. C., notice of Vol. II. of his Observations made at the Observatory of Harvard College 75
——, G. P., on the relative precision of measures of double stars taken photographically and by direct vision 71

Page
Bowerbank, Dr., annular solar eclipse of March 14–15, 1858, observed by 201
Breen, J. W., annular solar eclipse of March 14–15, 1858, observed by.... 190
Bruhns, Dr., discovery of Comet I. 1858 58
———, ——, elements of Comet I. 1858..... 134
———, ——, discovery of Comet IV. 1858..... 257
———, ——, elements and ephemeris of Comet V. 1858 272
———, ——, elements of Comet IV. 1858..... 322
———, ——, rediscovery of Faye's comet, by..... 324
———, ——, elements and ephemeris of Faye's comet 325
Burr, T. W., occultation observed by 27

Calliope, observations of 31, 71, 142
Calypso, elements of 271, 326
Carrington, R. C., notice of his Circumpolar Catalogue of 3735 Stars.... 23, 109
———, ——, account of his labours at the Redhill Observatory during the past year ..... ib.
———, ——, notice of recent modifications and improvements in telescopes at Paris 143
———, ——, on the evidence which the observed motions of the solar spots offer for the existence of an atmosphere surrounding the sun 169
———, ——, remarks on the total eclipse of the sun observable in Sept. 1858, on the west and east coasts of South America .. 213
———, ——, notice of his pamphlet containing information and suggestions relative to the total eclipse of the sun of Sept. 7, 1858 258
———, ——, additional note on the observation of a solar eclipse..... 312
———, ——, positions of the solar maculæ and faculæ on the day of the South American solar eclipse, Sept. 7–8, 1858 317
Caswell, Rev. H., annular solar eclipse of March 14–15, 1858, observed by 250
Cayley, A., on the development of the disturbing function in the planetary theory 32
———, —, on the problem of disturbed elliptic motion 155
Challis, Professor, account of operations executed at the Cambridge Observatory during the past year 103
———, ———, notice of his paper on the problem of three bodies 222
———, ———, observations of the annular solar eclipse of March 14–15, 1858, and calculation of results therefrom..... 205, 240
———, ———, notice of Vol. XVIII. of the Cambridge Observations.... 292
Circe, observations of..... 30
Clarke, Capt., on the determination of latitude with a transit instrument 264, 319
———, ——, on the reduction of occultations 277
———, W. B., observations made at Sydney during the solar eclipse of March 26, 1857 39
Colla, Professor, biographical notice of 93
Comets, general account of the discovery of, during the past year 147
——— V., 1857, observations of 229
——— VI., 1857, discovery of 14
———, ——, elements of..... 15
——— I., 1858, discovery of 57
———, ——, elements of 134, 229
——— II., 1858, discovery of..... 134
———, ——, elements of..... 166, 319
——— III., 1858, discovery of 266
———, ——, elements of..... 322
——— IV., 1858, discovery of 257
———, ——, elements of 322
——— V., 1858, discovery of..... 271
———, ——, elements and ephemeris of 272, 322
———, rediscovery of Encke's..... 306
———, elements of 310
———, rediscovery of Faye's 324

Page

Comets, elements and ephemeris of Faye's 325
Cross, J. E., annular solar eclipse of March 14–15, 1858, observed by 204

Dawes, Rev. W. R., on the appearance of round bright spots on one of the belts of *Jupiter* 6, 40, 72
———, ———, on the measurement of the position-angles of double stars, with the divided glass double-image micrometer 58
———, ———, observation of a spot on *Saturn* 72
———, ———, observations of the satellite of *Neptune* ..... ib.
———, ———, annular solar eclipse of March 14–15, 1858, observed by 188
De la Rue, Warren, remarks on the application of photography to astronomy 16
———, ———, on celestial photography..... 54
———, ———, account of his labours at the Cranford Observatory during the past year 110
———, ———, photographs of the moon 257
Dick, Dr., biographical notice of 98
Dobson, T., on the changes in the direction and length of the line of cusps during a solar eclipse 236
Donati, Dr., discovery of a new comet (Comet VI., 1857), by 14
———, elemetns and ephemeris of Comet V., 1858 322
———, discovery of a new comet, (Comet V. 1858,) by 271
Doris, observations of 32
Double stars, results of measures of γ *Virginis*..... 11, 316
——— ——, on the measurement of the position angles of, with the divided glass double-image micrometer..... 58
Drach, S. M., on the law of contraction of the nebulosity in Encke's Comet as given by Arago 169
Drew, Dr., biographical notice of 98
Dufour, Prof., notes on the scintillation of the stars..... 51
Dunkin, Mr., annular solar eclipse of March 14–15, 1858, observed at Greenwich by 273

Eaton, H. S., annular solar eclipse of March 14–15, 1858, observed by.. 202–3
Eclipse of Thales, note on Oltmann's calculation of the..... 143
Ellerly, W., observation of the occultation of α *Scorpii* 321
Encke, Professor, extracts of letters to the Astronomer Royal, relative to the comet which bears his name 306, 324
———, ———, researches on Faye's comet 324
Eunomia, observations of 141, 167, 232
Europa, observations of 168, 235
———, elements of 290
Euterpe, observations of 142, 168, 235

Fellows deceased..... 93
Fellows elected :—
John Watson, Esq. 1
Edward Tyler, Esq. ..... ib.
W. Hislop, Esq. ..... ib.
Chandos Wm. Hoskins, Esq. ..... ib.
C. H. Weston, Esq. ..... ib.
J. Robinson Maclean, Esq. 57
Col. Baron De Rottenburg, C.B. ..... ib.
C. V. Walker, Esq. ..... ib.
Nathaniel Beardmore, Esq. ..... ib.
W. Doeg, Esq. 85
Dr. Godfrey ..... ib.
W. Keith Murray, Esq. ..... ib.
Captain Arthur Cumming, R.N. 133
Dr. R. W. Eve ..... ib.
Rev. C. Evans ..... ib.
William Markby, Esq. 165

Page
Ferguson, J., discovery of a minor planet by 13
Flora, observations of 139, 166
Fortuna, observations of 141, 167, 235
Fox, C., observation of the solar eclipse of Sept. 17–18, 1857, by 162

Glaisher, James, notice of meteorological publications by 296
———, ———, annular solar eclipse of March 14–15, 1858, observed by .. 195
Goldschmidt, M., discovery of new planets by, (52), (54) 117, 302

Hansen, Professor, notice of his Lunar Tables 79
Hartnup, John, account of his operations at the Liverpool Observatory during the past year 106
———, ———, observations of Comet V., 1857, and Comet I., 1858 229
Hebe, observations of 232, 284, 318
Hestia, observations of 15
Hodgson, R., observation of a solar spot by 163
Hygeia, observations of 6, 31, 70

Iris, observations of 319
Irene, observations of 5, 31, 70, 140
Isis, observations of 32, 71, 141

Jacob, Capt., W. S., results of measurements of *Saturn's* satellites 1
———, ———, ———, occultation of the *Pleiades* observed at Madras 29
———, ———, ———, account of his labours at the Madras Observatory .. 108
———, ———, ———, extract of a letter to Sir William Keith Murray, relative to the colours of B and C of γ *Andromedæ* .. 169
———, ———, ———, note on the ternary star, 51 *Libræ* 317
Johnson, M. J., account of operations executed at the Radcliffe Observatory during the past year 102
———, ———, address on awarding the gold medal to Mr. Main 123
Jupiter, observations of bright spots on one of the belts of 6, 49, 72

King, Dr., biographical notice of 98

Lang, Major, solar eclipse of March 14–15, observed by 286
Lassell, William, observation of *Saturn* 231
———, ———, account of his labours in constructing a reflecting telescope of large dimensions 107
———, ———, observation of a small star in the vicinity of *Saturn's* ring 218
Latitude, on the determination of, with a transit instrument placed in the prime vertical 264
Laugier, M., researches on the proper motion of *Sirius* 289
Laurent, discovery of a new planet by 63
Leucothea, observations of 71
Lubbock, Sir J. W., note on the projection of a great circle 255
Lucknow Observatory, letter from Lieut. Tennant relative to the instruments of the 287
Luther, Dr., discovery of new planets by 13, 166
Lutetia, observations of 142, 166, 234

Maclear, Thomas, account of his labours at the Cape of Good Hope 107
———, ———, results of the trigonometrical survey executed in the Cape Colony 313
Mädler, Professor, note on the approaching conjunction of *Venus* with the sun 285
———, ———, note relative to the mode of determining the horizontal refraction at the surface of *Venus* 320
Maddy, Rev. W., biographical notice of 99

Page
Main, Rev. Robert, award of the gold medal to 91
———, ———, notice of his paper on refractions..... 92
M'Laren, Mr., annular solar eclipse of March 14–15, 1858, observed by .. 193
Martin, Capt., annular solar eclipse of March 14–15, 1858, observed by .. 249
Massilia, observations of 168, 234, 284
Medal, Gold, award of the, to Mr. Main 91
Melpomene, observations of 142, 166, 233, 285
Memoirs, Council Report respecting the..... 91
Mitchel, Professor, on personal equation 261
Metis, observations of 70, 140
Monthly Notices, Council report respecting the..... 91
———, ———, list of institutions and individuals entitled by the authority of the Council to receive the *Monthly Notices* as they are published 225
Murray, Sir W. K., experiments with a new refractor of 9-inches aperture 45
———, ————, annular solar eclipse of March 14–15, 1858, observed by 210
———, ————, observation of a small star in the vicinity of *Saturn's* ring..... 217

Nautical Almanack, notice of the publication of the, for 1861 26
Neptune's, satellite, observations of..... 72
Nicholson, Sir F., observation of the solar eclipse of Sept. 17–18, 1857, by 163
Noble, Capt., occultations observed by 27, 322
———, ———, observation of solar spots by 286

Occultations, observations of..... 26, 27, 29, 276, 322
Oeltzen, M., elements of *Calypso* 271, 326

Pales, observations of 32
Pape, M., elements of Comet VI., 1857 15
———, ———— Comet I., 1858..... 134
Parthenope, observations of 319
Phocea, observations of..... 4
Photography, celestial, notes on 54
Planets, minor, magnitudes of the, for the first day of each month in 1858.. 47
———, ———, observations of, made at the Royal Observatory 4, 30, 70, 139, 166, 232, 284
———, ———, general account of the discovery of, during the past year .. 117
———, (50) *Virginia*, discovery of..... 13
———, (52) *Nemausa*, discovery of 63
———, (52) *Europa*, discovery of 117
———, ————, elements of 290
———, (53) *Calypso*, discovery of 166
———, ————, elements of 271
———, (54) *Alexandra*, discovery of..... 302
———, (55), discovery of..... ib.
Pogson, Norman, observations of *Victoria* 12
———, ———, observations of *Hestia* 15
———, ———, magnitudes of forty of the minor planets for the first day of each month in 1858 47
———, ———, new variable stars discovered by..... 283, 311
Powell, Professor, note on Professor Smyth's new artificial horizon 65
Prince, C. L., observation of an occultation of *Mars* by the Moon, by 26
Pritchard, Rev. C., photometric experiments made at Clapham, on the day of the solar eclipse of March 14–15, 1858 245
Psyche, observations of 233, 285

Raper, Lieut. R.N., on a method of clearing the lunar distance 303
Recent Publications, notices of 21–26, 75–84, 219–225, 257–260, 291–299

Saturn, observation of a spot on 72

Page

Satellites of *Saturn*, results of measurements of 1
Schmidt, M., notice of his recent treatise on the solar spots 78
Schultz, Dr., elements of *Europa* 290
Searle, George, discovery of a new planet by 302
Secchi, Professor, notes on the nebula of *Orion* 8
Shadwell, Capt., observations of the solar eclipse of Sept. 17–18, 1857 162
Shea, Capt., observations of the solar spots 56, 327
Simms, W. H., notice of his paper on the corrections to be applied to observations made with a transit placed in the prime vertical 92
Simms, W. Jun., on a suggestion for improving the double-image micrometer 64
———, ———, annular solar eclipse of March 14–15, 1858, observed by 189
———, W. and J., annular solar eclipse of March 14–15, 1858, observed by 182
Slatter, J., annular solar eclipse of March 14–15, 1858, observed by..... 183
Smyth, Admiral, annular solar eclipse of March 14–15, 1858, observed by 192
——, ———, results of measures of *γ Virginis* 11, 316
Smyth, Prof. C. P., notice of vol. xi. of the Edinburgh Observations 21
——, —— — —, on a new artificial horizon 65
——, —— — —, account of observations executed at the observatory of Edinburgh during the past year 104
——, —— — —, on certain connecting points between lunar and terrestrial volcanoes..... 156
——, —— — —, annular solar eclipse of March 14–15, 1858, observed by 185
——, —— — —, Notice of his work entitled "Teneriffe" 298
Society, receipts and expenditure of the R.A., for 1857–58 85–6
———, assets and present property of the 86
———, stock of volumes of the Memoirs 87
———, number of fellows and associates ..... ib.
———, distribution of instruments belonging to the ..... ib.
———, list of papers noticed in the publications of the 119
———, list of contributors to the library, &c. 122
———, list of officers and council for the ensuing year 128
Solar eclipses, observations of the total eclipse of March 26, 1857 39
—— ———, observations of the eclipse of Sept. 17–18, 1857, made in China 162
—— ———, central line of the annular solar eclipse of March 14–15, 1858 73
—— ———, observations of the annular eclipse of March 14–15, 1858 181, 212, 246, 252, 273
—— ———, photometric experiments made on the day of the annular eclipse of March 14–15, 1858 245
—— ———, photographs of the annular eclipse of March 14–15, 1858 211, 216
—— ———, positions of the solar maculæ and faculæ on the day of the total eclipse of Sept. 7–8, 1858 317
Sopwith, T., annular solar eclipse of March 14–15, 1858, observed by 200
Stars, notes on the scintillations of the 51
Stock, Rev. A., observations of *η Argus* 306
Stuart, C., annular solar eclipse of March 14–15, 1858, observed by 193

Tennant, Lieut., letter from, containing information relative to the instruments of the Lucknow Observatory 287
Thalia, observations of 167, 233, 285
Themis, observations of 140, 167
Thetis, observations of 5
Tuttle, Mr., discovery of comets by 57, 236, 303

Victoria, observations of 5, 12, 32
Variable stars, ephemeris of, for the year 1858 135
Variable star, new 283

Walker, Thomas, annular solar eclipse of March 14–15, 1858, observed by 202
Webb, Rev. T. W., observes an occultation of *Regulus* 289

Page
Weston, C. H., annular solar eclipse of March 14–15, 1858, observed by .. 181
Wharton, Mr., observations of the annular solar eclipse of March 14–15, 1858 246
Whitbread, S. C., note on the lunar eclipse of February 27, 1858 217
Wild, Mr., biographical notice of 100
Wilkinson, P. T., annular solar eclipse of March 14–15, 1858, observed by 195
Wolfers, Prof., continuation of the *Tabulæ Regiomontanæ*, by 326
Wortham, Hale, annular solar eclipse of March 14–15, 1858, observed by 203
Worthington, Thomas, occultation of *Regulus* observed by 276
Winnecke, Dr., determination of the parallax of 21185 Lalande, by 289
———, ——, discovery of a comet by 134
———, ——, elements of Comet II., 1858 319

London :—Printed by G. Barclay, Castle St. Leicester Sq. and Published at the Apartments of the Society, October 9, 1858.